REMARKS

Amendments

Claims 1 and 21 have been amended to insert language regarding the S and D material portions of the amphipathic copolymer. Antecedent basis for this amendment is located in the specification at page 10, lines 12-16.

The Specification has been amended to update the status of the pending application cited therein.

It is respectfully submitted that no new matter is introduced by these amendments.

Claim Rejections

Claims 1 and 21 have been rejected under 35 USC 112, second paragraph as being indefinite.

More specifically, these claims have been stated to be indefinite in the terms S and D. These claims have been amended to relate these terms to the carrier liquid.

Claims 1-12 have been rejected under 35 USC 103 as being unpatentable over Baker 6,649,316 in view of Elmasry 4,978,598 and Jongewaard 4,988,602.

The present claims relate to liquid electrophotographic toner composition having toner particles dispersed in a liquid carrier having a Kauri-butanol number less than 30 mL. The toner particles comprise polymeric binder comprising at least one amphipathic copolymer comprising one or more S material portions and one or more D material portions, wherein the S material portions and the D material portions have respective solubilities in the liquid carrier that are sufficiently different from each other such that the S material portions tend to be more solvated by the carrier while the D material portions tend to be more dispersed in the carrier. One or more of the S or D material portions comprises the residue of a Soluble High T_g Monomer having a T_g at least about 20°C, wherein the absolute difference in Hildebrand solubility parameters between

the Soluble High Tg Monomer and the liquid carrier is less than about 3 $MPa^{1/2}$; and the D portions of the amphipathic copolymer each have a T_g at least about 30°C.

As noted in the specification beginning at the bottom of page 10, the liquid toner compositions according to the invention provide a system wherein an image can surprisingly be provided having excellent transfer under relatively low fusion temperature conditions, and yet be surprisingly resistant to blocking. Images made using the compositions of the present invention are surprisingly non-tacky and are resistant to marring and undesired erasure. The incorporation of a Soluble High T_g Monomer in the claimed toner particles surprisingly provides liquid toner compositions that exhibit lower fusing temperatures. As a result, printing equipment used in conjunction with preferred liquid toner compositions of the invention do not require as much energy to fuse the toner composition on the substrate.

As further noted in the specification at page 11, the benefits of the incorporation of Soluble High T_g Monomers are particularly surprising when the Soluble High T_g Monomers is located in the D portion of the polymeric constituent of the organosol. First because these monomers are soluble in the carrier liquid, it is surprising that they can be incorporated in an effective amount at this portion of the amphipathic copolymer. Additionally, the physical location of the D portion in the toner particle is generally considered to be at the internal part of the particle, and thus it would not be expected that this monomer at this location would have a meaningful impact on the fusion temperature of toner particles. After fusing, the binder material of the toner particle solidifies, and excellent blocking resistance is observed at temperatures up to about the melting temperature (T_m) of the amphipathic copolymer.

While not being bound by theory, it is believed that the Soluble High T_g Monomer component of the amphipathic copolymer has an affinity for the liquid carrier of the toner composition, and therefore tends to retain at least a small amount of the liquid carrier in the particle during the printing process. This liquid carrier is believed to have a plasticizing effect during the printing and image formation process, thereby reducing the fusing temperature when the toner is fused on the substrate as compared to an otherwise identical liquid toner composition that lacks a Soluble High T_g Monomer. See page 11 of the present specification.

Baker 6,649,316 describes a phase change developer comprising: (a) a carrier having a Kauri-butanol number less than 30; and (b) an organosol comprising a graft (co)polymeric steric stabilizer covalently bonded to a thermoplastic (co)polymeric core that is insoluble in said

carrier, and said (co)polymeric steric stabilizer comprises a crystallizing polymeric moiety that independently and reversibly crystallizes at or above 30°C, wherein said phase change developer has a melting point at or above 22°C.

As noted in the Baker '316 specification beginning at column 11, line 52, the term "phase change developer" has an accepted meaning within the imaging art. As the term indicates, the developer system is present as one physical phase under storage conditions (e.g., usually a solid) and transitions into another phase during development (usually a liquid phase), usually under the influence of heat or other directed energy sources. Thus, in the system as described in Baker '316, the toner is converted from a solid form to a liquid form prior to development, so that the toner as described first is in the solid form, and then through a specific manipulation is converted to liquid form under image formation conditions so that the actual image formation process is carried out in the form of a liquid. See column 2, lines 21-25. Baker '316 therefore does not teach or suggest a liquid toner as presently claimed. Baker '316 further does not teach or suggest use of a Soluble High T_g Monomer in an amphipathic copolymer, as required by the present claims.

Elmasry 4,978,598 describes liquid toners for developing electrophotographic images containing dispersed toner particles that are based on a polymer with multi-characteristics. These particles comprise a thermoplastic resinous core with a T_g below room temperature, which is chemically anchored to an amphipathic copolymer steric stabilizer containing covalently attached groups of a coordinating compound which in turn are capable of forming covalent links with organo-metallic charge directing compounds. As noted in the outstanding Office Action, the Elmasry disclosure notes that the core T_g can be from 25-105°C, provided that the toner can be coalesced at room temperature. In the context of the Elmasry disclosure, however, the core or disperse phase is insoluble or substantially insoluble in the carrier liquid of the liquid toner. This reference does not teach that soluble components can be incorporated in the core or disperse phase, and in particular does not teach or suggest use of a Soluble High T_g Monomer in an amphipathic copolymer, as required by the present claims. This reference therefore adds nothing to the Baker '316 reference that would suggest to the skilled artisan the invention of the present claims.

Jongewaard 4,988,602 describes liquid toners for developing electrophotographic images that contain dispersed toner particles that are based on a polymer with multi-characteristics. The particles described therein comprise a thermoplastic resinous core with a T_g below room temperature, which is chemically anchored to an amphipathic copolymer steric stabilizer containing covalently attached groups of a coordinating compound which in turn are capable of forming covalent links with organo-metallic charge directing compounds and a thermoplastic ester resin that functions as a charge enhancing component for the toner. As in Elmasry, this reference does not teach that soluble components can be incorporated in the core or disperse phase, and in particular does not teach or suggest use of a Soluble High T_g Monomer in an amphipathic copolymer, as required by the present claims. This reference therefore also adds nothing to the Baker '316 reference that would suggest to the skilled artisan the invention of the present claims.

The skilled artisan would have had no motivation to prepare a toner composition of the present claims, and could not have predicted that such compositions could provide a system wherein an image can surprisingly be provided having excellent transfer under relatively low fusion temperature conditions, and yet be surprisingly resistant to blocking, or which could be surprisingly non-tacky and resistant to marring and undesired erasure.

Claim Rejections – Double Patenting

Claims 1-22 have been provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-12 of copending Application No. 10/612765.

In order to overcome this provisional rejection and to expedite prosecution, a terminal disclaimer in view of copending Application No. 10/612765 is enclosed without prejudice.

CONCLUSION

In view of the above remarks, it is respectfully submitted that the foregoing is fully responsive to the outstanding Office action. In the event that a phone conference between the Examiner and the Applicant's undersigned attorney would help resolve any issues in the application, the Examiner is invited to contact said attorney at (651) 275-9811.

Respectfully Submitted,

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By: _____

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